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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,403	11/11/2002	Andrew Jonathan Turberfield	480821.90116	2958
7590	05/05/2004		EXAMINER	
Quarles & Brady 411 East Wisconsin Avenue Milwaukee, WI 53202-4497			CHEA, THORL	
			ART UNIT	PAPER NUMBER
			1752	

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/088,403

Applicant(s)

TURBERFIELD ET AL.

Examiner

Thorl Chea

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on November 11, 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                             |                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                 | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                        | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>072402</u> . | 6) <input type="checkbox"/> Other: _____                                                |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 22-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 22 is unclear with respect to the language "substantially as hereinbefore described". The term "wherever" in claim 23 is unclear since the specification is silence with respect to the place to be performed the method with respect to claim 1".

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/09439 (WO'439) in combination with the applicants' disclosure on page 2, third paragraph; Journal of Vacuum Science & technology B, 1995, vol. 13, no. 6, 30012-3016 (Lee et al) Optics Letters, 1998, vol. 23, no. 22, 1745-1747 (Witzgall et al), and Patil et al (US Patent No. 5,907,333).

WO'439 discloses a method for forming a photonic crystal material having 3-D periodic structure comprising steps as claimed including the suggestion of the use of a high density of photochemically induced cross-linking that is rendered relatively insoluble and retained during

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development. See the WO'439 as a whole, and especially the abstract, claims 1-19 on pages 17-19, the negative photoresist and cross-linking material on pages 13, lines 18-30.

The WO'439 fails to specifically disclose the photosensitive material possessing an average number of crosslinkable groups per mole at least 3 with an equivalent weight per crosslinkable group at most 1000. However, the claimed photosensitive material has been available in the art and has been used in the formation of 3-D structure. Note to the specification on page 2 lines 15-30 which disclosed that the glycidyl ether of bisphenol A novolac is available as EPON-SU-8 from Shell Chemical, and it has 8 epoxy group per molecule. Witzgall et al discloses the use SU-8 film in the process of forming a 3-D structure, and the after exposure, the film was developed by heating to 100 °C for 0.5 h (postbake). See document as a whole. Lee et al discloses the SU-8, a negative-tone photoresist consisting of EPON SU-8 resin from Shell Chemical and photosensitized with triaryl sulfonium, and the photoresist is subject to postbake to a 15 mn postbake on a hot plate for 90-95 °C. See page 312. Patil et al disclose dysfunctional epoxy compound such as EPON-SU-8 and photoinitiator such as onium salt in column 4, lines 14-63. It also disclosed the use of thermal energy during or after exposure to radiation source to accelerate the hardening reaction in column 8, lines 25-30. It would have been obvious to the worker of ordinary skill in the art at the time the invention was made to a known photosensitive material such as cross-linking material suggested by WO'439 by a known photosensitive material disclosed in the applicant's disclosure, Lee et al, Witzgall et al or Patil et al in the process taught in the WO'439, and thereby provide a process and material as claimed.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 23 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Optics Letters, 1998, vol. 23, no. 22, 1745-1747 (Witzgall et al). Witzgall et al discloses a 3-D structure using commercial photoresist SU-8. see page 1754. The 3-D structure are similar even though they are made by different process. "(E)ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same or obvious from a product of prior art, the claim is unpatentable even though the prior art product was made by different process." In re Thorpe 777 F.2d 695, 698, 227 USPQ 694, 966 (Fed. Cir. 1985).

***Double Patenting***

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible

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harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-23 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 6,358,653 (Turberfield) in view of the applicants' disclosure on page 2, third paragraph; *Journal of Vacuum Science & technology B*, 1995, vol. 13, no. 6, 30012-3016 (Lee et al), *Optics Letters*, 1998, vol. 23, no. 22, 1745-1747 (Witzgall et al), and Patil et al (US Patent No. 5,907,333). The invention claimed in the '653 patent and that of the present claimed invention differs in the selection of the photosensitive, but the selection of the crosslinkable photosensitive material would have been found prima facie obvious over the applicants' disclosure on page 2, third paragraph; *Journal of Vacuum Science & technology B*, 1995, vol. 13, no. 6, 30012-3016 (Lee et al), *Optics Letters*, 1998, vol. 23, no. 22, 1745-1747 (Witzgall et al), and Patil et al (US Patent No. 5,907,333). See the teachings of each reference in paragraph 4 above. The photoresist such as SU-8 taught in Lee et al can be used in a formation of thick layer and achieve high resolution. Therefore, it would have been obvious to worker of ordinary skill in the art to select the SU-8 in the process of forming 3-D structure claimed in '653 patent for same reason and thereby provide an invention as claimed.


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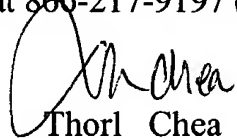
***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thorl Chea whose telephone number is (571)272-1328. The examiner can normally be reached on M-F (9:00 - 5:30).

11. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on (571)272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tchea   
April 27, 2004

  
Thorl Chea  
Primary Examiner  
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